Nasal reconstruction: extending the limits

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Nasal Reconstruction: Extending the Limits

Farid Rezaeian, MD*†
Marcus Corsten, MD*
Sebastian Haack, MD*
Wolfgang M. Gubisch, MD*
Helmut Fischer, MD*

Summary: Reconstructing the 3-dimensional structure of the nose requires the maintenance of its aesthetic form and function. Restoration of the correct dimension, projection, skin quality, symmetrical contour, and function remains problematic. Consequently, modern approaches of nasal reconstruction aim at rebuilding the units rather than just covering the defect. However, revising or redoing a failed or insufficient reconstruction remains very challenging and requires experience and creativity. Here, we present a very particular case with a male patient, who underwent 37 operations elsewhere and presented with a failed nasal reconstruction. We describe and illustrate the complex steps of the nasal rereconstruction, including the reconstruction of the forehead donor site, surgical delay procedures for lining, and the coverage with a third paramedian forehead flap. *(Plast Reconstr Surg Glob Open 2016;4:e804; doi: 10.1097/GOX.0000000000000801; Published online 15 July 2016.)*

Reconstruction of the nose requires attention to form and function considering the size and localization of the defect with regard to the existing aesthetic subunits.[1] Despite the availability of fundamental principles for nasal reconstruction, every nasal reconstruction requires a very individual, challenging, and time-consuming preoperative planning.[2,3] For full-thickness defects, restoration of cover, framework, and lining has to be considered in the surgical plan. Besides the reconstruction of the 3-dimensional nasal structure, one has to maintain its aesthetic form and function. The paramedian forehead flap still represents the golden standard for cover; however, several surgical steps of thinning and refinements have to be included to achieve pleasant results.[4,5] As foreign materials are associated with an increased risk of infection, the framework should be reconstructed with autogenous grafts from rib or ear cartilage,[6] which have to be fixed firmly to guarantee stable projection and correct axial positioning of the nose. For lining composite skin grafts, skin and mucosa grafts, hingeover flaps, perinasal local flaps, folded or second forehead flaps, and free flaps[7] are available.

Restoration of the correct dimension, projection, skin quality, symmetrical contour, and function remains problematic. Consequently, modern approaches of nasal reconstruction aim at rebuilding the units rather than just covering the defect. However, revising or redoing a failed or insufficient reconstruction remains very challenging and requires experience and creativity. Accordingly, we would like to present a very particular case with a male patient, who underwent 37 operations elsewhere, resulting in a completely failed nasal reconstruction.

CASE

History and Clinical Findings

A 48-year-old man presented with a failed nasal reconstruction after having been diagnosed with squamous cell carcinoma of the nasal cavity (T4N0M0) in 2009. After tumor resection, the patient underwent combined radiochemotherapy followed by nasal reconstruction elsewhere in 2010. Among others, a free-radial forearm flap for inner lining and rib cartilage for the framework had both failed. He presented with 2 poor forehead flaps (Fig. 1A). The right ala had been sufficiently reconstructed by an ipsilateral paramedian forehead flap, whereas reconstruction of the left ala was insufficient because of flap loss and infections (Fig. 1A). A second forehead flap from the left was supposed to become the caudal septum and found inserted at the premaxilla and connected with a 2-mm-thin cord

*From the *Department of Facial Plastic Surgery, Marienhospital Stuttgart, Stuttgart, Germany; and †Department of Plastic Surgery and Hand Surgery, University Hospital of Zurich, Zurich, Switzerland.*
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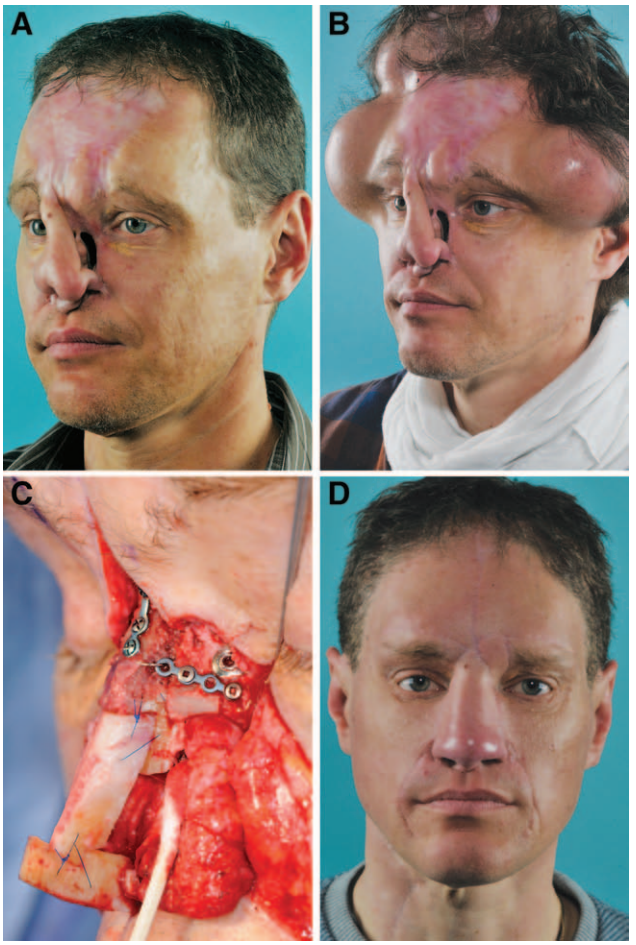

Fig. 1. A, First presentation of the patient with a failed nasal reconstruction and scarred forehead donor site after having undergone 37 operations elsewhere, including 2 paramedian forehead flaps and a radial forearm free flap. B, Reconstruction of the forehead donor site by implementation of 3 expanders. C, Reconstruction of the osseocartilaginous frame using the sixth rib and fixation with miniplates and microplates. The use of predelayed turn-over flaps for lining. D, Final result after several thinning procedures.

at the residual nasal process of the frontal bone (Fig. 1A). Silicone tubes were placed to keep the vestibules open. In addition, the forehead flap was supported by a piece of silicone, and the left-side wall of the nose was completely missing. The available tissue material from both transposed forehead flaps did not qualify for progressing the nasal reconstruction. The left forehead was extensively scarred, and the donor site of the flap on the right side had not yet healed (Fig. 1A). Altogether, the patient had undergone 37 operations over 18 months and was desperate and exhausted.

Operative Procedures for Redoing the Nasal Reconstruction

First, after implantation of 3 expanders for forehead reconstruction (Fig. 1B), we removed them after 3 months, reinserted the right paramedian forehead flap to its original donor site, and connected it to the excessively expanded surrounding skin tissue. In the same procedure, we improved the attachment of the "septum flap" by transposing small flaps from the nasion area. In the third surgical procedure after 2 months, we again removed subcutaneous scar tissue for debulking the "septum" and creating hinge flaps for dorsal lining. Two months later, we reimplanted an expander in the forehead to prepare a sufficiently sized forehead flap for nasal rereconstruction. Also, we designed 2 V-Y flaps based at the piriform aperture to precondition the lining turn-over flaps for later reconstruction of both lateral side walls. During the fifth operation, these nasolabial V-Y flaps were further delayed, the "septum" was thinned again, and tragal cartilage was inserted to keep it expanded intermediately.

Four weeks later, the new forehead flap was designed, and the new borders were incised without elevating the flap as a surgical delay procedure. Finally, during the seventh operation, the inner lining, including the partial neoseptum, was reconstructed by turn-over flaps from the previous forehead flap and the delayed V-Y flaps from the paranasal cheek region (Fig. 1C). The sixth rib was harvested for framework reconstruction consisting of a central and cephalic osseocartilaginous frame, which was fixed by 1 miniplate and 2 microplates (Fig. 1C). Furthermore, the dorsum was recreated by a cartilaginous beam with intercalated joints with the neorhinion and the nasal tip. The anterior pillar was reconstructed using a straight rib cartilage beam fixed to the previously implanted tragus graft. Nasal tip framework was reconstructed with a cap graft and 2 symmetrically bent grafts for both alae (Fig. 1C). Also, the upper lateral cartilages were recreated by cartilaginous grafts. The nasal dorsum was constructed with diced cartilage in Tutoplast fascia lata. Finally, cover was reconstructed with the preexpanded and delayed paramedian forehead flap. This was followed by several refinements, flap thinning, and division of the flap's pedicle after 3 months, finally resulting in a very satisfying result for both the patient and the surgeon (Fig. 1D).

DISCUSSION

We described a rereconstruction of a patient's nose, which had previously been operated on 37 times elsewhere. First, we reconstructed the forehead as a donor site for a later paramedian forehead flap for skin coverage, and then, we used hinged and turn-over flaps prefabricated by surgical delays as inner lining, rib cartilage, and bone as framework.

In conclusion, redoing a failed nasal reconstruction requires a precise plan of what given flap material is eligible for reuse after which pretreatment and what can only be discarded. Which secondary procedures can still be applied? Is a second free flap for lining reasonable and acceptable for the patient? Are there reliable alternatives with pedicled flaps for lining? Is tissue expansion applicable? How many steps will be required including delay procedures? Which procedures can be combined to shorten the whole process? Is a prosthetic replacement the better solution at last? To resolve these questions a strong

surgeon–patient relationship has to be built up. Complications are not uncommon and have to be identified and treated immediately. The surgeon must be ready to meet the high demands of such procedures and/or organize a competent team.

Farid Rezaeian, MD
Department of Plastic Surgery and Hand Surgery
University of Zurich
Rämistrasse 100
CH-8091 Zurich
Switzerland
E-mail: farid.rezaeian@usz.ch

PATIENT CONSENT

The patient provided written consent for the use of his image.

REFERENCES

1. Burget GC, Menick FJ. The subunit principle in nasal reconstruction. *Plast Reconstr Surg.* 1985;76:239–247.
2. Burget GC, Menick FJ. *Aesthetic Reconstruction of the Nose.* St. Louis: Mosby; 1994.
3. Menick FJ. A 10-year experience in nasal reconstruction with the three-stage forehead flap. *Plast Reconstr Surg.* 2002;109:1839–1855
4. Menick FJ. Nasal reconstruction. *Plast Reconstr Surg.* 2010;125:138e–150e.
5. Fischer H. Nasal reconstruction with the paramedian forehead flap–details for success. *Facial Plast Surg.* 2014;30:318–331.
6. von Gregory HF, Fischer H, Eppstein RJ, et al. Framework fabrication with rib cartilage in partial and total nasal reconstruction. *Facial Plast Surg.* 2014;30:306–317.
7. Haack S, Fischer H, Gubisch W. Lining in nasal reconstruction. *Facial Plast Surg.* 2014;30:287–299.